Docket No. 11016-0007

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

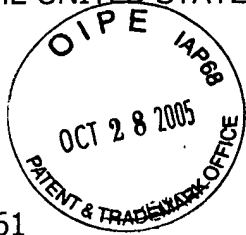In re Application of:

BAINA, et al.

Serial No.: 10/018,661

Examiner: Holmes, Michael B.

Art Unit: 2121

Filing Date: June 18, 2002

Title: Method For Evaluating The Quality Of Audio-Visual Sequences

REQUEST FOR RECONSIDERATION

Commissioner of Patents
PO Box 1450
Alexandria, VA 22303

SIR:

In response to the Office Action dated June 30, 2005, this response is presented with a petition for a one month extension of time, for which payment details are provided at the end of this paper. Currently, claims 1-6 are before the Examiner for consideration on their merits.

In review, the Examiner has rejected claims 1-6 under 35 U.S.C. § 101 on the grounds that the claim language is not limited to practical applications. This rejection is respectfully traversed on the grounds that the claims do have a practical application and are therefore statutory.

The invention is related to the field of audio and video signals and the problems of degradation of these signals during routines of compression and then decompression. The background art section goes through a lengthy discussion of the manner in which the prior art has dealt with qualifying the degradations that affect picture and sound quality. Two methods are described, subjective and objective. The subjective tests are the results

of submitting the audiovisual signals to a panel of observers. The objective tests use perception models to simulate the behavior of the human perceptual system in part or in full. A problem faced in the field is obtaining a good correlation between the objective measurement and a subjective score, see page 8, lines 9-30.

The present invention is an improvement in this field of endeavor and makes it possible to achieve a good correspondence between objective measurements and subjective scores given by a panel. The invention achieves this goal, as set forth in claim 1, by building up a database of training vectors based on training sequences involving a first vectorization method, classifying the training vectors into classes of scores to form training sets having training scores allocated thereto, generating a vector MO using the first vectorization method from a given sequence, and allocating a training score to the audiovisual sequence for evaluation.

It is not understood how the claimed method cannot have a practical application. In the rejection, the Examiner contends that the invention relates to "a computational model or mathematical manipulation of a function or equation, as such, a process that merely manipulates an abstract idea or performs a purely mathematical algorithm is non-statutory despite the fact that it might inherently have some usefulness." The stance fails to take into account the details of claim 1 and that it is more than just an "algorithm." Claim 1 calls for creation of a database in 1(a), and uses an audiovisual sequence to be evaluated to generate a vector MO. The database and use of an audiovisual sequence are real steps; they are not a mathematical manipulation as alleged in the Office Action. Therefore, the claim has practical application in terms of evaluating audiovisual sequences.

For the reasons set forth above, it is contended that the claims fall within the purview of 35 U.S.C. § 101, and the rejection is flawed and must be withdrawn.

Turning now to the prior art rejection, claims 1, 2, and 4 are rejected under 35 U.S.C. § 103(a) based on a Quincy et al. article entitled "Expert Pattern Recognition Method and for Technology-Independent Classification of Video" (Quincy 1988) when taken in view of another Quincy et al. article entitled "Speech Quality Assessment Using Expert Pattern Recognition Techniques" (Quincy 1989). It is respectfully contended that the rejection is flawed for the reasons given below.

In the rejection, the Examiner characterizes Quincy 1988 as describing all of the features of the invention as defined in claim 1 but for evaluating an audio sequence. In response to this alleged deficiency, the Examiner first contends that Quincy 1989 teaches evaluating an audio signal. The Examiner contends that it would be obvious to combine Quincy 1988 and 1989 "because automatic assessment of voice transmission quality is increasingly important to users and providers of communication services and products."

Lastly, claims 3, 5, and 6 have been indicated as containing allowable subject matter. Since Applicants believe that the rejection is in error, the decision to limit the claims by incorporation of the subject matter of dependent claims is deferred pending outcome of the Examiner's decision on patentability based on this response.

The reasons mandating withdrawal of the rejection are set forth below with respect to claim 1, and delineated using the steps set forth in this claim and the secondary reference.

Claim 1(a)

First, Quincy 1988 does not teach the features of claim 1 except for treatment of an audio signal as alleged in the Office Action. Quincy 1988 relates to a method of classifying video transmission quality by expert systems that make use of a database based on <u>probabilities</u>. This expert system approach has been widely used in the field of artificial intelligence until the end of the 1980's. Such a system is complicated in that it used a knowledge base in the form of production rules referred to as situation-action or if-then logical rules, and an inference engine to apply production rules from the knowledge base to current measurement and obtain the best classification, see page 1305, left column, last paragraph and the right column, first paragraph.

In contrast, claim 1(a) defines a training step which employs a first vectorization method to build up a database of training vectors to allow quality assessment. The does not use the probabilities employed in Quincy 1988. In the rejection, the Examiner repeats the language of the claim 1, step (a), and then cites virtually the entire Quincy 1988 article as support for the rejection. It is submitted that the Examiner has failed in his burden to establish a basis for alleging the step (a) of claim 1 is taught. The database referred to in Quincy 1988 is not generated in the way claimed, and the failure of Quincy 1988 to teach step (a) means that the rejection is flawed.

In reality, the vector quantization method of claim 1 is functionally very different from the expert system of Quincy 1988, both in its architecture and in its implementation since the invention operates on cases and not on logical rules. The expert system approach of Quincy 1988 implies two steps, namely a first step of low-level processing and initial classification using logical rules and a second step of refined classification using

perception rules. In contrast, the claimed process uses only a vector quantization which relies on a database comprised of the situations that are relevant for quality assessment.

The Examiner is called upon to substantiate any further rejection of claim 1, by citation of page, paragraph and line number to support the allegation that the step (a) is found in Quincy 1988.

Claim 1(b)

Quincy 1988 also fails to teach the step of 1(b) and the step of classifying the vectors into classes of scores. As with the rejection of step 1(a), the Examiner merely cites pages of Quincy 1988, but fails to identify the basis for asserting that Quincy 1988 teaches step (b) of claim 1.

Again, the Examiner is requested to substantiate any further allegation that step (b) is found in Quincy 1988.

Claim 1(d)

It is further contended that Quincy 1988 fails to teach the feature of claim 1(d). Therein, the significant training score that corresponds to the training set containing the vector that is closest to the vector MO is allocated to the audiovisual sequence. As with the other rejections, the Examiner merely refers to Quincy 1988 as the basis for alleging that the step of (d) is taught. This is insufficient to establish a *prima facie* case of obviousness, and either the Examiner must identify the basis for the rejection by line number or withdraw the rejection.

Since Quincy 1988 does not teach the features of claim 1, steps (a), (b), and (d), the rejection is flawed. The only way the rejection could be cured would be if Quincy 1989 remedied the flaws in Quincy 1988. This curing cannot occur for two reasons. First,

Quincy 1988 and 1989 are fundamentally different from each other, and there is no reason to combine the two teachings. Second, even if they were combined, Quincy 1989 does not teach the features outlined above that are not found in Quincy 1988.

Quincy 1989

Quincy 1989 also describes an expert system approach that utilizes three steps, one of training, one of calculating the probability density of each vector, and one of calculating a MOS note. These steps are only mentioned in the "System Overview" section of Quincy 1989 and the remainder of the document does not clearly distinguish between the steps. Nevertheless, it is believed that Quincy 1989 teaches a first step of an automatic selection of parameters from the analysis of more than 200 parameters (features) and of their associated subjective note. There parameters are obtained from impaired vocal signals (see page 208, left column, last paragraph and lines 1-6 of the first column and "Parameter Evaluation".)

A second step in Quincy 1989 relates to a calculation of the density probability of each vector, which is typical of an expert system approach. Each vector is formed from parameters (frames) of an audio sequence having a certain duration (frame). The description of this step is broadly generic and lacking details. Quincy 1989 does not say if the probabilities are calculated from vectors of a dictionary or database.

The third step involves calculating a MOS note by calculating the probability that an input vector of parameters corresponds to each quality note, and the final MOS note is obtained by adding the probabilities that weight the note of 5 classes of quality 1-5 (excellent/good/fair/poor/bad).

As stated above, the two Quincy articles are not merely different in terms of audio or video, as argued by the Examiner. Their methodologies are entirely different, and one of skill in the art would not look to one to modify the other. The Examiner's basis for the combination, i.e., automatic assessment is beneficial to the communication field oversimplifies the issues. Just because two references are in the same field does not mean that their teachings can be combined. For example, methods of making aluminum and steel are in the metallurgy field, but one would not look to methods for making steel to modify methods to make aluminum. Similarly, just because Quincy 1988 and 1989 are in the field of classifying video or audio signals does not mean that one can pick and choose from one and apply a selected feature to the other. A fair reading of Quincy 1988 and 1989 can only lead to the conclusion that the two expert system approaches are not similar, and not combinable for the reason set forth in the rejection. Therefore, the rejection must fail for this reason.

Even, *assuming, arguendo,* that Quincy 1989 was combined with Quincy 1988, the combination of the two still fails to establish a *prima facie* case of obviousness against claim 1. Quincy 1989 does not make up for the failings outlined above in Quincy 1988, and even when combined, the features of claim 1 are still not taught or suggested.

Based on the above, it is respectfully submitted that the rejection of claim 1 is flawed and must be withdrawn. Since claim 1 has been shown to be patentable over the applied prior art, claims 2 and 4 are also in condition for allowance.

Accordingly, the Examiner is respectfully requested to examine this application in light of this Amendment, and pass claims 1-6 onto issuance.
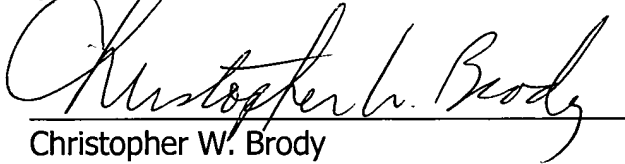
Serial No.: 10/018,661

If the Examiner believes that an interview with Applicants' attorney would be helpful in expediting allowance of this application, the Examiner is requested to telephone the undersigned at 202-835-1753.

The above constitutes a complete response to all issues raised in the Office Action dated June 30, 2005.

Again, reconsideration and allowance of this application is respectfully requested.

A petition for a one month extension of time is made, and a check for $120.00 is enclosed to cover the petition fee. Please charge any fee deficiency or credit any overpayment to Deposit Account No. 50-1088.

Respectfully submitted,
CLARK & BRODY

Christopher W. Brody
Reg. No. 33,613

Customer No. 22902
1090 Vermont Ave., NW, Suite 250
Washington, DC 20005
Telephone: 202-835-1111
Facsimile: 202-835-1755
Docket No.: 11016-0007
Date: October 28, 2005